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Alyson Dill, EIC 2100 Team Leader
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☐ **1. Concepts for science autonomy during robotic traverse and survey**
Smith, T.; Niekum, S.; Thompson, D.; Wettergreen, D.;
Aerospace, 2005 IEEE Conference
5-12 March 2005 Page(s):347 - 355
Digital Object Identifier 10.1109/AERO.2005.1559327
AbstractPlus | Full Text: PDF(288 KB) IEEE CNF
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☐ **2. A Microwave Relay System**
Thompson, L.E.;
Proceedings of the IRE
Volume 34, Issue 12, Dec. 1946 Page(s):936 - 942
AbstractPlus | Full Text: PDF(3408 KB) IEEE JNL
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☐ **3. Whole-Cell Sensing for a Harmful Bloom-Forming Microscopic Alga by M Antibody–Antigen Forces**
Lee, A.S.; Mahapatro, M.; Caron, D.A.; Requicha, A.A.G.; Stauffer, B.A.; Thom C.;
NanoBioscience, IEEE Transactions on
Volume 5, Issue 3, Sept. 2006 Page(s):149 - 156
Digital Object Identifier 10.1109/TNB.2006.880767
AbstractPlus | Full Text: PDF(1384 KB) IEEE JNL
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☐ **4. Space-Charge Limitations on the Focus of Electron Beams**
Thompson, B.J.; Headrick, L.B.;
Proceedings of the IRE
Volume 28, Issue 7, July 1940 Page(s):318 - 324
AbstractPlus | Full Text: PDF(1280 KB) IEEE JNL
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☐ **5. Building a Distance Function for Gestalt Grouping**
Zobrist, A.L.; Thompson, W.B.;
Computers, IEEE Transactions on
Volume C-24, Issue 7, July 1975 Page(s):718 - 728
AbstractPlus | Full Text: PDF(3296 KB) IEEE JNL

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6. **Adaptive reproducing kernel particle method for extraction of the cortical**
Meihe Xu; Thompson, P.M.; Toga, A.W.;
Medical Imaging, IEEE Transactions on
Volume 25, Issue 6, June 2006 Page(s):755 - 767
Digital Object Identifier 10.1109/TMI.2006.873614
AbstractPlus | Full Text: PDF(5184 KB) IEEE JNL
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7. **A central positron source to perform the timing alignment of detectors in**
Thompson, C.J.; Camborde, M.-L.; Casey, M.E.;
Nuclear Science, IEEE Transactions on
Volume 52, Issue 5, Part 1, Oct. 2005 Page(s):1300 - 1304
Digital Object Identifier 10.1109/TNS.2005.858234
AbstractPlus | Full Text: PDF(312 KB) IEEE JNL
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8. **MOS field effect transistors formed by gate masked ion implantation**
Bower, R.W.; Dill, H.G.; Aubuchon, K.G.; Thompson, S.A.;
Electron Devices, IEEE Transactions on
Volume 15, Issue 10, Oct 1968 Page(s):757 - 761
AbstractPlus | Full Text: PDF(760 KB) IEEE JNL
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9. **The very large array: Design and performance of a modern synthesis radi**
Napier, P.J.; Thompson, A.R.; Ekers, R.D.;
Proceedings of the IEEE
Volume 71, Issue 11, Nov. 1983 Page(s):1295 - 1320
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10. **The Solar Cell-A Novel Transducer**
Puckett, R.; Thompson, L.;
Parts, Materials and Packaging, IEEE Transactions on
Volume 1, Issue 2, Sep 1965 Page(s):23 - 28
AbstractPlus | Full Text: PDF(976 KB) IEEE JNL
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11. **Satellite-Aircraft Multipath and Ranging Experiment Results at L Band**
Sutton, R.; Schroeder, E.; Thompson, A.; Wilson, S.;
Communications, IEEE Transactions on [legacy, pre - 1988]
Volume 21, Issue 5, May 1973 Page(s):639 - 647
AbstractPlus | Full Text: PDF(1072 KB) IEEE JNL
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12. **Crystal structure and magnetic properties in CeCo5-PrCo5alloy system**
Narita, K.; Yamamoto, H.;
Magnetics, IEEE Transactions on
Volume 17, Issue 5, Sep 1981 Page(s):2466 - 2470
AbstractPlus | Full Text: PDF(536 KB) IEEE JNL
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13. **TEM Impedance and Cross Coupling for Small Circular Center Conductor Ridged Waveguide**
Storer, J.E.; Thompson, T.W.;
Microwave Theory and Techniques, IEEE Transactions on
Volume 9, Issue 2, Mar 1961 Page(s):116 - 123

AbstractPlus | Full Text: PDF(512 KB) IEEE JNL
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☐ **14. The effects of detector material and structure on PET spatial resolution a**
Thompson, C.J.;
Nuclear Science, IEEE Transactions on
Volume 37, Issue 2, Part 2, April 1990 Page(s):718 - 724
Digital Object Identifier 10.1109/23.106704

AbstractPlus | Full Text: PDF(488 KB) IEEE JNL
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☐ **15. Automated particulate sampler for Comprehensive Test Ban Treaty verifi radionuclide aerosol sampler/analyzer)**
Bowyer, S.M.; Miley, H.S.; Thompson, R.C.; Hubbard, C.W.;
Nuclear Science, IEEE Transactions on
Volume 44, Issue 3, Part 1, June 1997 Page(s):551 - 556
Digital Object Identifier 10.1109/23.603709

AbstractPlus | Full Text: PDF(844 KB) IEEE JNL
Rights and Permissions

☐ **16. An adaptive level set segmentation on a triangulated mesh**
Meihe Xu; Thompson, P.M.; Toga, A.W.;
Medical Imaging, IEEE Transactions on
Volume 23, Issue 2, Feb. 2004 Page(s):191 - 201
Digital Object Identifier 10.1109/TMI.2003.822823

AbstractPlus | References | Full Text: PDF(848 KB) IEEE JNL
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☐ **17. Distance Learning Review**
Lecky-Thompson, R.;
Computing & Control Engineering Journal
Volume 9, Issue 2, April 1998 Page(s):79 - 79

AbstractPlus | Full Text: PDF(120 KB) IEE JNL

☐ **18. Landmark matching on the sphere using distance functions**
Lepore, N.; Leow, A.; Thompson, P.;
Biomedical Imaging: Macro to Nano, 2006. 3rd IEEE International Symposium
6-9 April 2006 Page(s):450 - 453
Digital Object Identifier 10.1109/ISBI.2006.1624950

AbstractPlus | Full Text: PDF(294 KB) IEEE CNF
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☐ **19. Regional quantitative analysis of cortical surface maps of FDG PET imag**
Protas, H.D.; Thompson, P.M.; Hayashi, K.M.; Chin-Lung Yu; Bergsneider, M.; Huang;
Nuclear Science Symposium Conference Record, 2005 IEEE
Volume 3, 23-29 Oct. 2005 Page(s):4 pp.
Digital Object Identifier 10.1109/NSSMIC.2005.1596673

AbstractPlus | Full Text: PDF(1589 KB) IEEE CNF
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☐ **20. Continuous Curvature Trajectory Generation with Obstacle Avoidance fo Robots**
Thompson, S.; Kagami, S.;
Computational Intelligence for Modelling, Control and Automation, 2005 and Ir Conference on Intelligent Agents, Web Technologies and Internet Commerce, Conference on
Volume 1, 28-30 Nov. 2005 Page(s):863 - 870
Digital Object Identifier 10.1109/CIMCA.2005.1631373

AbstractPlus | Full Text: PDF(496 KB) IEEE CNF
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☐ **21. Surface parameterization using Riemann surface structure**
Yalin Wang; Xianfeng Gu; Hayashi, K.M.; Chan, T.F.; Thompson, P.M.; Shing-
Computer Vision, 2005. ICCV 2005. Tenth IEEE International Conference on
Volume 2, 17-21 Oct. 2005 Page(s):1061 - 1066 Vol. 2
Digital Object Identifier 10.1109/ICCV.2005.233

AbstractPlus | Full Text: PDF(416 KB) IEEE CNF
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☐ **22. A central positron source to perform the timing alignment of detectors in**
Thompson, C.J.; Camborde, M.-L.; Casey, M.E.;
Nuclear Science Symposium Conference Record, 2004 IEEE
Volume 4, 16-22 Oct. 2004 Page(s):2361 - 2365 Vol. 4
Digital Object Identifier 10.1109/NSSMIC.2004.1462731

AbstractPlus | Full Text: PDF(1806 KB) IEEE CNF
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☐ **23. Verification of stereo vision based localization system**
Masuda, K.; Thompson, S.; Kagami, S.; Kanade, T.;
Systems, Man and Cybernetics, 2004 IEEE International Conference on
Volume 6, 10-13 Oct. 2004 Page(s):5435 - 5440 vol.6
Digital Object Identifier 10.1109/ICSMC.2004.1401058

AbstractPlus | Full Text: PDF(697 KB) IEEE CNF
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☐ **24. Rough interface reconstruction using the level set method**
Kim, Y.; Raghu Machiraju; Thompson, D.;
Visualization, 2004. IEEE
2004 Page(s):251 - 258
Digital Object Identifier 10.1109/VISUAL.2004.94

AbstractPlus | Full Text: PDF(584 KB) IEEE CNF
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☐ **25. Thermal cycling reliability of lead free solders for automotive application**
Suhling, J.C.; Gale, H.S.; Johnson, R.W.; Islam, M.N.; Shete, T.; Lall, P.; Boza
J.L.; Ping Seto; Gupta, T.; Thompson, J.R.;
Thermal and Thermomechanical Phenomena in Electronic Systems, 2004. ITH
Ninth Intersociety Conference on
Volume 2, 1-4 June 2004 Page(s):350 - 357 Vol.2
Digital Object Identifier 10.1109/ITHERM.2004.1318304

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Todd J. Green, Ashish Gupta, Gerome Miklau, Makoto Onizuka, Dan Suciu

December 2004 **ACM Transactions on Database Systems (TODS)**, Volume 29 Issue 4

Publisher: ACM Press

Full text available: pdf(717.00 KB) Additional Information: full citation, abstract, references, index terms

We consider the problem of evaluating a large number of XPath expressions on a stream of XML packets. We contribute two novel techniques. The first is to use a single Deterministic Finite Automaton (DFA). The contribution here is to show that the DFA can be used effectively for this problem: in our experiments we achieve a constant throughput, independently of the number of XPath expressions. The major issue is the size of the DFA, which, in theory, can be exponential in the number of XPath expr ...

Keywords: XML processing, stream processing

2 **The Compilation of Regular Expressions into Integrated Circuits**

Robert W. Floyd, Jeffrey D. Ullman

July 1982 **Journal of the ACM (JACM)**, Volume 29 Issue 3

Publisher: ACM Press

Full text available: pdf(983.18 KB) Additional Information: full citation, references, citings, index terms

3 **Fast text searching for regular expressions or automaton searching on tries**

Ricardo A. Baeza-Yates, Gaston H. Gonnet

November 1996 **Journal of the ACM (JACM)**, Volume 43 Issue 6

Publisher: ACM Press

Full text available: pdf(584.80 KB) Additional Information: full citation, abstract, references, citings, index terms, review

We present algorithms for efficient searching of regular expressions on preprocessed text, using a Patricia tree as a logical model for the index. We obtain searching algorithms that run in logarithmic expected time in the size of the text for a wide subclass of regular expressions, and in sublinear expected time for any regular expression. This is the first

such algorithm to be found with this complexity.

4 On the use of regular expressions for searching text

Charles L. A. Clarke, Gordon V. Cormack

May 1997 **ACM Transactions on Programming Languages and Systems (TOPLAS)**, Volume 19 Issue 3

Publisher: ACM Press

Full text available: pdf(221.79 KB) Additional Information: full citation, abstract, references, citings, index terms

The use of regular expressions for text search is widely known and well understood. It is then surprising that the standard techniques and tools prove to be of limited use for searching structured text formatted with SGML or similar markup languages. Our experience with structured text search has caused us to reexamine the current practice. The generally accepted rule of "leftmost longest match" is an unfortunate choice and is at the root of the difficulties. We instead propose ...

Keywords: SGML, regular expressions, regular languages

5 Fast and simple character classes and bounded gaps pattern matching, with application to protein searching

Gonzalo Navarro, Mathieu Raffinot

April 2001 **Proceedings of the fifth annual international conference on Computational biology**

Publisher: ACM Press

Full text available: pdf(270.01 KB) Additional Information: full citation, abstract, references, citings, index terms

The problem of fast searching of a pattern that contains Classes of characters and Bounded size Gaps (CBG) in a text has a wide range of applications, among which a very important one is protein pattern matching (for instance, one PROSITE protein site is associated with the CBG $[RK] - x(2, 3) - [DE] - x(2, 3) - Y$, where the brackets match any of the letters inside, and $x(2, 3)$ a gap of length between 2 and 3). Currently, the on ...

Keywords: PROSITE, bit-parallelism, computational biology, information retrieval, pattern matching

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EIC 2100

STIC Database Tracking Number: 202896

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Susan Chen Location: RND 3A01 Art Unit: 2161 Tuesday, September 26, 2006 Case Serial Number: 10/773595	Carol Wong Location: EIC 2100 RND-4B28 Phone: 571-272-3513 Carol.Wong@uspto.gov

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What is the topic, novelty, motivation, utility, or other specific details defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, definitions, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract, background, brief summary, pertinent claims and any citations of relevant art you have found.

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English Abstract
A system for determining the start of a match of a regular expression

includes a special state table that contains start entries and terminal entries, and a set of start state registers for holding offset information. The system further includes a DFA next state table that, given the current state and an input character, returns the next state. A settable indicator is included in the DFA next state table corresponding to each next state table entry which indicates whether to perform a lookup in the special state table. A compiler loads values into the special state table based on the regular expression. A method for determining the start of a match of a regular expression using the special state table, the set of start state registers and the DFA next state table, includes the step of determining from the regular expression each start-of match start state and each end-of-match terminal state. For each start state, a start state entry is loaded into the special state table. For each terminal state, a terminal state entry is loaded into each special state table. The next state table is used to return the next state from the current state and an input character. When a start state is encountered, the current offset from the beginning of the input character string is loaded into the start state register. When a terminal state is encountered, the terminal state entry is retrieved from the special state table, and the value of the start state register corresponding to the rule number of the terminal entry in the special state table is further retrieved. The value of the start state register which is retrieved indicates the location in the character string where the start-of-match occurred for a particular rule.

French Abstract
L'invention concerne un systeme permettant de detecter le debut d'une correspondance d'une expression reguliere, comprenant une table d'etat special contenant des entrees de debut et des entrees de fin, et une serie de registres d'etat de debut servant a contenir des informations d'ecart. Le systeme comprend egalement une table d'etat suivant DFA (automate deterministe a etats finis) qui, selon l'etat reel et un caractere entre, retourne l'etat suivant. La table d'etat suivant DFA comprend un indicateur reglable correspondant a chaque entree de table d'etat suivant indiquant s'il faut effectuer une recherche dans la table d'etat special. Ce systeme comprend egalement un compilateur permettant de charger des valeurs dans la table d'etat special sur la base de l'expression reguliere. L'invention concerne egalement un procede permettant de detecter le debut d'une correspondance d'une expression reguliere a l'aide de la table d'etat special, de l'ensemble de registres d'etat de debut et de la table d'etat suivant DFA, consistant a detecter a partir de l'expression reguliere chaque etat de debut de correspondance et chaque etat final de correspondance de fin. Pour chaque etat de debut, une entree d'etat de debut est chargee dans la table d'etat special. Pour chaque etat final, une entree d'etat final est chargee dans chaque table d'etat special. La table d'etat suivant est utilisee pour retourner l'etat suivant a partir de l'etat reel et un caractere d'entree. Lorsqu'un etat de debut est rencontre, le decalage reel par rapport au debut de la chaine de caracteres d'entree est charge dans le registre d'etat de debut. Lorsqu'un etat final est rencontre, l'entree d'etat final est recuperee de la table d'etat special, et la valeur du registre d'etat de debut correspondant au numero de regle de l'entree finale dans la table d'etat special est egalement recuperee. La valeur du registre d'etat de debut qui est recuperee indique l'emplacement dans la chaine de caracteres ou le debut de correspondant s'est produit pour une regle particuliere.

Legal Status (Type, Date, Text)
Publication 20040826 A2 Without international search report and to be republished upon receipt of that report.

? t9/5,k/2-3

9/5,K/2 (Item 2 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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01142581

METHODS AND APPARATUSES FOR EVALUATION OF REGULAR EXPRESSIONS OF ARBITRARY SIZE

PROCEDES ET APPAREILS POUR L'EVALUATION D'EXPRESSIONS REGULIERES DE TAILLE ARBITRAIRE

Patent Applicant/Assignee:
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Legal Representative:
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Patent and Priority Information (Country, Number, Date):
Patent: WO 200463886 A2-A3 20040729 (WO 0463886)
Application: WO 2004US435 20040109 (PCT/WO US04000435)
Priority Application: US 2003438847 20030109
Designated States:
(All protection types applied unless otherwise stated - for applications 2004+)
AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
(EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE SI SK TR
(OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
(AP) BW GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Main International Patent Class (v7): G05B-019/042
International Patent Class (v7): G05B-019/045
Publication Language: English
Filing Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 12630

English Abstract
Embodiments of the invention provide a programmable FSA building block, having a number of programmable registers and associated logic implemented therein, that provide the capability of contextually evaluating complex REs of arbitrary size against multiple data streams. Embodiments of the invention provide fully programmable hardware in which all of the states of an RE are instantiated and all of the states are fully connected. For one embodiment, the building blocks have a fixed number of states to facilitate implementation on a chip. For such an embodiment, an RE having an excessive number of states is implemented on two or more FSA building blocks and the FSA building blocks are then stitched together to effect evaluation of the RE. For one embodiment, two or more REs having a number of states less than the fixed number of states of a building block may be implemented with a single building block.

French Abstract

La presente invention, dans divers modes de realisation, a trait a un bloc fonctionnel d'automates d'etats finis programmable, comportant une pluralite de registres programmables et une logique associee qui y sont executes, fournissant la capacite d'evaluer en contexte des expressions regulieres complexes de taille arbitraire par rapport a de multiples trains de donnees. Les modes de realisation de l'invention fournissent un materiel entierement programmable dans lequel sont instancies tous les etats d'une expression reguliere et tous les etats sont entierement relies. Dans un mode de realisation, les blocs fonctionnels ont un nombre fixe d'etats afin de faciliter l'execution sur une puce. Pour un tel mode de realisation, une expression reguliere presentant un nombre excessif d'etats est execute sur au moins deux blocs fonctionnels d'automate d'etats finis et les blocs fonctionnels d'automates d'etats finis sont ensuite lies ensemble pour realiser une evaluation de l'expression reguliere. Dans un mode de realisation, au moins deux expressions regulieres presentant un nombre d'etats inferieur au nombre d'etats fixe d'un bloc fonctionnel peuvent etre executes avec un bloc fonctionnel unique.

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Publication 20040729 A2 Without international search report and to be republished upon receipt of that report.
Search Rpt 20040910 Late publication of international search report
Republication 20040910 A3 With international search report.
Republication 20040910 A3 Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

Fulltext Availability:
Detailed Description

Detailed Description
... Figure 3, may be used to implement a state machine architecture for realization of a **non - deterministic finite state automata** with R nodes, R symbols, and R A2 arcs. In Figure 3, R has been...

...FSA building block described above can be used to realize fast and efficient implementations of **non - deterministic finite state automata** (NFA) in hardware. The specification of an NFA naturally maps to the apparatus. Since regular expressions...

...Techniques, and Tools" by Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman]. Notable algorithms include **Thompson** 's construction and the Berry-Sethi construction. These algorithms map a regular expression comprising of...

9/5,K/3 (Item 3 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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01099909 **Image available**
METHOD AND APPARATUS FOR EFFICIENT IMPLEMENTATION AND EVALUATION OF STATE MACHINES AND PROGRAMMABLE FINITE STATE AUTOMATA
PROCEDE ET DISPOSITIF POUR LA MISE EN OEUVRE ET L'EVALUATION EFFICACE D'AUTOMATES FINIS ET D'AUTOMATES FINIS PROGRAMMABLES
Patent Applicant/Assignee:
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Patent Applicant/Inventor:

SHARANGPANI Harshvardhan, *, US, US (Residence), -- (Nationality), (Designated only for: US)
Legal Representative:
MALLIE Michael J (et al) (agent), Blakely, Sokoloff, Taylor & Zafman LLP, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025, US,

Patent and Priority Information (Country, Number, Date):
  Patent: WO 200421181 A2-A3 20040311 (WO 0421181)
  Application: WO 2003US27292 20030828 (PCT/WO US03027292)
  Priority Application: US 2002406835 20020828; US 2003650364 20030827
Designated States:
(Protection type is "patent" unless otherwise stated - for applications prior to 2004)
  AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ
  EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR
  LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE SG SK
  SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW
  (EP) AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LU MC NL PT RO SE
  SI SK TR
  (OA) BF BJ CF CG CI CM GA GN GQ GW ML MR NE SN TD TG
  (AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
  (EA) AM AZ BY KG KZ MD RU TJ TM
Main International Patent Class (v7): G05B-019/042
International Patent Class (v7): G05B-019/045; G06F-009/44
Publication Language: English
Filing Language: English
Fulltext Availability:
  Detailed Description
  Claims
Fulltext Word Count: 9443

English Abstract
  A method and apparatus for efficient implementation and evaluation of state machines and programmable finite state automata is described. In one embodiment, a state machine architecture comprises a plurality of node elements, wherein each of the plurality of node elements represents a node of a control flow graph. The state machine architecture also comprises a plurality of interconnections to connect node elements, a plurality of state transition connectivity control logic to enable and disable connections within the plurality of interconnections to form the control flow graph with the plurality of node elements, and a plurality of state transition evaluation logic coupled to the interconnections and operable to evaluate input data against criteria, the plurality of state transition evaluation logic to control one or more state transitions between node elements in the control flow graph.

French Abstract
  L'invention concerne un procede et un dispositif pour la mise en oeuvre et l'evaluation efficace d'automates finis et d'automates finis programmables. Selon une variante, on decrit une architecture d'automate fini qui comprend plusieurs elements de noeud, chacun de ces elements representant un noeud de graphe de flux de commande. L'architecture comprend aussi plusieurs interconnexions pour la connexion des elements de noeud, plusieurs logiques de commande de connectivite de transition d'etat pour l'activcation et la desactivation de connexions dans les interconnexions considerees, visant a etablir le graphe de commande de flux avec la pluralite d'elements de noeud, et plusieurs logiques d'evaluation de transition d'etat couplees aux interconnexions et permettant d'evaluer les donnees d'entree par rapport a des criteres, les logiques d'evaluation de transition d'etat controlant une ou plusieurs transitions d'etat entre les elements de noeud dans le graphe de flux de commande.

Legal Status (Type, Date, Text)
Publication 20040311 A2 Without international search report and to be republished upon receipt of that report.
Search Rpt 20040422 Late publication of international search report
Republication 20040422 A3 With international search report.
Republication 20040422 A3 Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

Fulltext Availability:
Detailed Description

Detailed Description
... one embodiment can accommodate several thousand state machines (each comprised of, for example, 16-state non -deterministic finite state automata) on a single chip.
[00421 Figure 2 illustrates a sample embodiment...illustrates one embodiment of the state machine architecture, as tailored for the realization of non- deterministic finite state automata and for the parallel evaluation of multiple regular expressions on input data. Figure 4 shows...

...b) shows the embodiment of the architecture for realization of a state machine for a non - deterministic finite state automata with R nodes, R symbols, and R A2 arcs. In Figure 3(b), R = 3...
?

```
File 347:JAPIO Dec 1976-2005/Dec(Updated 060404)
         (c) 2006 JPO & JAPIO
File 350:Derwent WPIX 1963-2006/UD=200660
         (c) 2006 The Thomson Corporation

Set     Items   Description
S1        962   FINITE(1W)STATE? ?(1W)(AUTOMAT?? OR MACHINE? ?)
S2        222   DFA OR DFSA OR DAFSA OR DETERMINI?(1W)S1
S3         96   NFA OR NFSA OR (NONDETERMINI? OR NON()DETERMINI?)(1W)S1
S4          0   THOMPSON? ?(1W)CONSTRUCT?
S5         99   INDUCT???(1W)CONSTRUCT?
S6          0   S2 AND S3 AND S5
S7          0   S2 AND S3 AND INDUCTIVE
S8          0   S2 AND S3 AND THOMPSON?
?
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File 696:DIALOG Telecom. Newsletters 1995-2006/Sep 25
         (c) 2006 Dialog
File  15:ABI/Inform(R) 1971-2006/Sep 25
         (c) 2006 ProQuest Info&Learning
File  98:General Sci Abs 1984-2006/Sep
         (c) 2006 The HW Wilson Co.
File 484:Periodical Abs Plustext 1986-2006/Sep W3
         (c) 2006 ProQuest
File 813:PR Newswire 1987-1999/Apr 30
         (c) 1999 PR Newswire Association Inc
File 613:PR Newswire 1999-2006/Sep 26
         (c) 2006 PR Newswire Association Inc
File 635:Business Dateline(R) 1985-2006/Sep 20
         (c) 2006 ProQuest Info&Learning
File 810:Business Wire 1986-1999/Feb 28
         (c) 1999 Business Wire
File 610:Business Wire 1999-2006/Sep 26
         (c) 2006 Business Wire.
File 369:New Scientist 1994-2006/Aug W1
         (c) 2006 Reed Business Information Ltd.
File 370:Science 1996-1999/Jul W3
         (c) 1999 AAAS
File 239:Mathsci 1940-2006/Nov
         (c) 2006 American Mathematical Society

Set     Items   Description
S1       1477   FINITE(1W)STATE? ?(1W)(AUTOMAT?? OR MACHINE? ?)
S2       1412   DFA OR DFSA OR DAFSA OR DETERMINI?(1W)S1
S3       1364   NFA OR NFSA OR (NONDETERMINI? OR NON()DETERMINI?)(1W)S1
S4         83   THOMPSON? ?(1W)CONSTRUCT?
S5        311   INDUCT???(1W)CONSTRUCT?
S6          0   S2 AND S3 AND S5
S7          0   S2 AND S3 AND INDUCTIVE
S8          4   S2 AND S3 AND THOMPSON?
S9          3   RD  (unique items)

 9/3,K/2     (Item 1 from file: 239)
DIALOG(R)File 239:Mathsci
(c) 2006 American Mathematical Society. All rts. reserv.

  03625506  MR 2005a#68121
  Follow automata.
  Ilie, Lucian (Department of Computer Science, University of Western
    Ontario, London, Ontario, N6A 3K7, Canada)
  Yu, Sheng (Department of Computer Science, University of Western Ontario,
    London, Ontario, N6A 3K7, Canada)
  Corporate Source Codes: 3-WON-C; 3-WON-C
  Inform. and Comput.
  Information and Computation,   2003,   186,  no. 1,  140--162.  ISSN:
0890-5401
  Language: English   Summary Language: English
  Subfile: MR (Mathematical Reviews)  AMS
  Abstract Length: LONG (29 lines)
  Reviewer: Nico, William R. (1-CASH)

  ...a language is described by a regular expression, one can construct a
nondeterministic finite automaton ( NFA ) which will recognize that
language. There are well-known algorithms for constructing such  NFA . This
paper surveys existing algorithms and presents two new constructions which
are designed both to produce small---near minimal--- NFA  and to do so
efficiently. The authors' first new construction allows
$\epsilon$-transitions, while the...

...don't count). The first construction uses $O(\vert \alpha\vert )$ time
```

to generate an NFA of size $\leq {3\over 2}\vert \alpha\vert +{5\over 2}$, where the size of an NFA is the sum of the number of states and number of transitions. They show that...

...construction is near optimal by producing a family of regular expressions for which every recognizing NFA has size $\geq {4\over 3}\vert \alpha\vert +{1\over 3}$.
The elimination of...

...and space $O(\vert \alpha\vert \sp 2)$.
The authors compare the size of the NFA produced by their algorithm with other well-known constructions, and give several examples of regular ...

9/3,K/3 (Item 2 from file: 239)
DIALOG(R)File 239:Mathsci
(c) 2006 American Mathematical Society. All rts. reserv.

02765464 MR 98c#68112
From regular expressions to DFA 's using compressed NFA 's.
Chang, Chia-Hsiang (Institute of Information Science, Academia Sinica, Taipei 11529, Taiwan (R.O.C.))
Paige, Robert (Courant Institute of Mathematical Sciences, New York University, New York, New York, 10003)
Corporate Source Codes: RC-AST-I; 1-NY-X
Theoret. Comput. Sci.
Theoretical Computer Science, 1997, 178, no. 1-2, 1--36. ISSN: 0304-3975 CODEN: TCSDI
Language: English Summary Language: English
Subfile: MR (Mathematical Reviews) AMS
Abstract Length: LONG (34 lines)
Reviewer: Summary

From regular expressions to DFA 's using compressed NFA 's.
Summary: ``There are two principal methods for turning regular expressions into NFA 's---one due to McNaughton and Yamada and another due to **Thompson** . Unfortunately, both have drawbacks. Given a regular expression R of length r with s occurrences...
...r)$ space algorithms to produce a $\Theta(m)$ space representation of McNaughton and Yamada's NFA with $s+1$ states and m transitions. The problem with this NFA is that $m=\Theta(s\sp 2)$ in the worst case. **Thompson** 's method takes $\Theta(r)$ time and space to construct a $\Theta(r)$ space NFA with $\Theta(r)$ states and $\Theta(r)$ transitions. The problem with this NFA is that r can be arbitrarily larger than s.
``We overcome the drawbacks of both...

...s)$ space algorithm to construct an $O(s)$ space representation of McNaughton and Yamada's NFA . Given any set V of NFA states, our representation can be used to compute the set U of states one transition ...

...V$ in optimal time $O(\vert V\vert+\vert U\vert)$. McNaughton and Yamada's NFA requires $\Theta(\vert V\vert\times\vert U\vert)$ time in the worst case. Using **Thompson** 's NFA , the equivalent calculation requires $\Theta(r)$ time in the worst case. Comparative benchmarks show that an implementation of our method outperforms implementations of competing methods with respect to time for NFA construction, NFA acceptance testing, and NFA -to- DFA conversion by subset construction.
``Throughout this paper program transformations are used to design algorithms and...
?

```
File   9:Business & Industry(R) Jul/1994-2006/Sep 25
         (c) 2006  The Gale Group
File  16:Gale Group PROMT(R) 1990-2006/Sep 25
         (c) 2006 The Gale Group
File  47:Gale Group Magazine DB(TM) 1959-2006/Sep 25
         (c) 2006 The Gale group
File 148:Gale Group Trade & Industry DB 1976-2006/Sep 26
         (c)2006 The Gale Group
File 160:Gale Group PROMT(R) 1972-1989
         (c) 1999 The Gale Group
File 275:Gale Group Computer DB(TM) 1983-2006/Sep 25
         (c) 2006 The Gale Group
File 621:Gale Group New Prod.Annou.(R) 1985-2006/Sep 25
         (c) 2006 The Gale Group
File 624:McGraw-Hill Publications 1985-2006/Sep 26
         (c) 2006 McGraw-Hill Co. Inc
File 634:San Jose Mercury  Jun 1985-2006/Sep 24
         (c) 2006 San Jose Mercury News
File 636:Gale Group Newsletter DB(TM) 1987-2006/Sep 25
         (c) 2006 The Gale Group
File 649:Gale Group Newswire ASAP(TM) 2006/Sep 12
         (c) 2006 The Gale Group
File 647:CMP  Computer Fulltext 1988-2006/Nov W2
         (c) 2006 CMP Media, LLC
File 674:Computer News Fulltext 1989-2006/Sep W1
         (c) 2006 IDG Communications

Set     Items   Description
S1       1798   FINITE(1W)STATE? ?(1W)(AUTOMAT?? OR MACHINE? ?)
S2       6223   DFA OR DFSA OR DAFSA OR DETERMINI?(1W)S1
S3       3627   NFA OR NFSA OR (NONDETERMINI? OR NON()DETERMINI?)(1W)S1
S4        174   THOMPSON? ?(1W)CONSTRUCT?
S5         75   INDUCT???(1W)CONSTRUCT?
S6          0   S2 AND S3 AND S5
S7          0   S2 AND S3 AND INDUCTIVE
S8          0   S2 AND S3 AND THOMPSON?
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File 256:TecInfoSource 82-2006/Jan
(c) 2006 Info.Sources Inc

Set	Items	Description
S1	7	FINITE(1W)STATE? ?(1W)(AUTOMAT?? OR MACHINE? ?)
S2	1	DFA OR DFSA OR DAFSA OR DETERMINI?(1W)S1
S3	1	NFA OR NFSA OR (NONDETERMINI? OR NON()DETERMINI?)(1W)S1
S4	0	THOMPSON? ?(1W)CONSTRUCT?
S5	0	INDUCT???(1W)CONSTRUCT?
S6	0	S2 AND S3 AND S5
S7	0	S2 AND S3 AND INDUCTIVE
S8	0	S2 AND S3 AND THOMPSON?

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File   2:INSPEC 1898-2006/Sep W3
         (c) 2006 Institution of Electrical Engineers
File   6:NTIS 1964-2006/Sep W2
         (c) 2006 NTIS, Intl Cpyrght All Rights Res
File   8:Ei Compendex(R) 1970-2006/Sep W3
         (c) 2006 Elsevier Eng.  Info. Inc.
File  34:SciSearch(R) Cited Ref Sci 1990-2006/Sep W3
         (c) 2006 The Thomson Corp
File  35:Dissertation Abs Online 1861-2006/Aug
         (c) 2006 ProQuest Info&Learning
File  65:Inside Conferences 1993-2006/Sep 26
         (c) 2006 BLDSC all rts. reserv.
File  94:JICST-EPlus 1985-2006/Jun W3
         (c)2006 Japan Science and Tech Corp(JST)
File  95:TEME-Technology & Management 1989-2006/Sep W4
         (c) 2006 FIZ TECHNIK
File  99:Wilson Appl. Sci & Tech Abs 1983-2006/Jul
         (c) 2006 The HW Wilson Co.
File 144:Pascal 1973-2006/Sep W1
         (c) 2006 INIST/CNRS
File 266:FEDRIP 2006/Aug
         Comp & dist by NTIS, Intl Copyright All Rights Res
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 2006 The Thomson Corp
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
         (c) 2002 The Gale Group
File  56:Computer and Information Systems Abstracts 1966-2006/Sep
         (c) 2006 CSA.
File  60:ANTE: Abstracts in New Tech & Engineer 1966-2006/Sep
         (c) 2006 CSA.

Set     Items   Description
S1      19029   FINITE(1W)STATE? ?(1W)(AUTOMAT?? OR MACHINE? ?)
S2       4188   DFA OR DFSA OR DAFSA OR DETERMINI?(1W)S1
S3       1695   NFA OR NFSA OR (NONDETERMINI? OR NON()DETERMINI?)(1W)S1
S4         14   THOMPSON? ?(1W)CONSTRUCT?
S5        676   INDUCT???(1W)CONSTRUCT?
S6          0   S2 AND S3 AND S5
S7          0   S2 AND S3 AND INDUCTIVE
S8         12   S2 AND S3 AND THOMPSON?
S9          1   S2 AND S3 AND S4
S10        12   S8:S9
S11         0   S10/2004:2006
S12         7   RD S10  (unique items)
S13   2540086   DISTANCE? OR DISTANT OR FAR OR REMOTE OR REMOVED
S14         0   S12 AND S13

 12/7/1     (Item 1 from file: 2)
DIALOG(R)File   2:INSPEC
(c) 2006 Institution of Electrical Engineers. All rts. reserv.

06608561   INSPEC Abstract Number: C9707-4220-012
 Title: From regular expressions to DFAs using compressed NFAs
  Author(s): Chia-Hsiang Chang; Paige, R.
  Author Affiliation: Inst. of Inf. Sci., Acad. Sinica, Taipei, Taiwan
  Journal: Theoretical Computer Science    vol.178, no.1-2    p.1-36
  Publisher: Elsevier,
  Publication Date: 30 May 1997  Country of Publication: Netherlands
  CODEN: TCSCDI  ISSN: 0304-3975
  SICI: 0304-3975(19970530)178:1/2L.1:FRED;1-8
  Material Identity Number: T168-97012
  U.S. Copyright Clearance Center Code: 0304-3975/97/$17.00
  Document Number: S0304-3975(96)00140-5
  Language: English    Document Type: Journal Paper (JP)
```

Treatment: Practical (P); Theoretical (T)
Abstract: There are two principal methods for turning regular expressions into NFAs-one due to R. McNaughton and H. Yamada (1960) and another due to K. Thompson (1968). Unfortunately, both have drawbacks. Given a regular expression R of length r and with s occurrences of alphabet symbols, Chang and Paige (1992) and Bruggemann-Klein (1993) gave Theta (m+r) time and O(r) space algorithms to produce a Theta (m) space representation of McNaughton and Yamada's NFA with s+1 states and m transitions. The problem with this NFA is that m= Theta (s/sup 2/) in the worst case. Thompson 's method takes Theta (r) time and space to construct a Theta (r) space NFA with Theta (r) states and Theta (r) transitions. The problem with this NFA is that v can be arbitrarily larger than s. We overcome drawbacks of both methods with a Theta (r) time Theta (s) space algorithm to construct an O(s) space representation of McNaughton and Yamada's NFA . Given any set V of NFA states, our representation can be used to compute the set U of states one transition away from the states in V in optimal time O(; V; +; U ;). McNaughton and Yamada's NFA requires Theta (; V; x; U;) time in the worst case. Using Thompson 's NFA , the equivalent calculation requires Theta (r) time in the worst case. Comparative benchmarks show that an implementation of our method outperforms implementations of competing methods with respect to time for NFA construction, NFA accepting testing, and NFA -to- DFA conversion by subset construction. Throughout this paper program transformations are used to design algorithms and derive programs. A transformation of special importance is a form of finite differencing used previously by D. Smith to improve the efficiency of functional programs. (26 Refs)
Subfile: C
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12/7/2 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC
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05548580 INSPEC Abstract Number: C9401-4220-019
Title: Finite state automata from regular expression trees
Author(s): Goldberg, R.R.
Author Affiliation: Queens Coll., City Univ. of New York, NY, USA
Journal: Computer Journal vol.36, no.7 p.623-30
Publication Date: 1993 Country of Publication: UK
CODEN: CMPJA6 ISSN: 0010-4620
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Thompson (1968) introduced an innovative method for obtaining non - deterministic finite state automata (nfa) from regular expressions. His formulation of nfas makes use of epsilon -transitions (null symbol input) and requires in the worst case 2 sigma +2 OPS states, where sigma is the number of occurrences of alphabet symbols and OPS is the number of operands in the original regular expression. We modify this algorithm to obtain a nfa M without epsilon -transitions that has in the worst case sigma +1 states. Using multi-branch expression trees to store the regular expressions efficiently, the algorithm presented is directly parallelizable. The algorithm necessitates that we maintain a finite state automata which has no epsilon -transitions and has a starting node of zero in-degree. The role of epsilon -transitions in finite state automata is examined and, based on the technique of bypassing, two alternative approaches are suggested. (15 Refs)
Subfile: C

12/7/3 (Item 1 from file: 6)
DIALOG(R)File 6:NTIS
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1703620 NTIS Accession Number: PB93-135986

Non-Deterministic Recogniser: Generator Generator
Nymeyer, A.
Technische Univ. Twente, Enschede (Netherlands). Dept. of Computer Science.
Corp. Source Codes: 090700004
Report No.: MEMO-INF-92-21
c1992 27p
Languages: English
Journal Announcement: GRAI9307
Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
NTIS Prices: PC A03/MF A01
Country of Publication: Netherlands
Non-deterministic finite automata are used in applications, like scanners and editors, that use pattern matching. **Thompson** 's **construction** is an algorithm that will generate a non-deterministic finite automaton given a regular expression. The author takes a fresh look at this construction method. He specifies and implements it using an attribute grammar, and using a scanner and parser generator, he builds recognizer generators that can generate a recognizer for a given regular expression. The recognizer uses a backtracking algorithm to determine whether a string matches the regular expression. He also considers and solves the problem of regular expressions that cause the recognizer to loop.

12/7/4 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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04726528 E.I. No: EIP97063700740
Title: From regular expressions to DFA **'s using compressed** NFA **'s**
Author: Chang, Chia-Hsiang; Paige, Robert
Corporate Source: Academica Sinica, Taipei, Taiwan
Source: Theoretical Computer Science v 178 n 1-2 May 30 1997. p 1-36
Publication Year: 1997
CODEN: TCSCDI ISSN: 0304-3975
Language: English
Document Type: JA; (Journal Article) Treatment: T; (Theoretical)
Journal Announcement: 9708W2
Abstract: Program transformations constitute a form of finite differencing to improve the efficiency of functional programs and are used to design and derive programs. There are two methods to transform regular expressions into **NFA** 's, one due to McNaughton and Yamada and the other due to **Thompson** . Given regular expressions R of length r and with s occurrences of alphabet symbols, Theta (m plus r) time and O(r) space algorithms are derived to produce Theta (m) space representation of McNaughton and Yamada's **NFA** with s plus 1 states and m transitions. However, the drawback of this **NFA** is that m equals Theta (s**2) in the worst case. **Thompson** 's method takes Theta (r) time and space to construct a Theta (r) space and Theta (r) transitions but r can be arbitrarily larger than s. 26 Refs.

12/7/5 (Item 2 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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03816514 E.I. No: EIP94031231198
Title: Finite state automataaa from regular expression tress
Author: Goldberg, Robert R.
Corporate Source: Queen College of CUNY, Flushing, NY, USA
Source: Computer Journal v 36 n 7 1993. p 623-630
Publication Year: 1993

CODEN: CMPJA6 ISSN: 0010-4620
Language: English
Document Type: JA; (Journal Article) Treatment: T; (Theoretical)
Journal Announcement: 9404W5
Abstract: Thompson introduced an innovative method for obtaining non-deterministic finite state automata (nfa) from regular expressions. His formulation of nfas makes use of epsilon -transitions (null symbol point). We modify this algorithm to obtain a nfa M without epsilon -transitions that has in the worst case delta plus 1 states. Using multi-branch expression trees to store the regular expressions efficiently, the algorithm presented here is directly parallizable. The algorithm necessitates that we maintain a finite state automata which has no epsilon -transitions and has a starting node of zero in-degree. (Edited author abstract) 15 Refs.

12/7/6 (Item 1 from file: 35)
DIALOG(R)File 35:Dissertation Abs Online
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01279883 ORDER NO: AAD93-06756
FROM REGULAR EXPRESSIONS TO DFA 'S USING COMPRESSED NFA 'S (NFA)
Author: CHANG, CHIA-HSIANG
Degree: PH.D.
Year: 1992
Corporate Source/Institution: NEW YORK UNIVERSITY (0146)
Adviser: ROBERT A. PAIGE
Source: VOLUME 53/11-B OF DISSERTATION ABSTRACTS INTERNATIONAL.
PAGE 5813. 242 PAGES

We show how to turn a regular expression R of length r into an O(s) space representation of McNaughton and Yamada's NFA , where s is the number of occurrences of alphabet symbols in R, and s + 1 is the number of NFA states. The standard adjacency list representation of McNaughton and Yamada's NFA takes up 1 + 2s + $s\sp2$ space in the worst case. The adjacency list representation of the NFA produced by Thompson takes up between 2r and 6r space, where r can be arbitrarily larger than s. Given any subset V of states in McNaughton and Yamada's NFA , our representation can be used to compute the set U of states one transition away from the states in V in optimal time O($\vert V\vert + \vert U\vert$). McNaughton and Yamada's NFA requires Θ($\vert V\vert \times \vert U\vert$) time in the worst case. Using Thompson 's NFA , the equivalent calculation requires Θ(r) time in the worst case.

An implementation of our NFA representation confirms that it takes up an order of magnitude less space than McNaughton and Yamada's machine. An implementation to produce a DFA from our NFA representation by subset construction shows linear and quadratic speedups over subset construction starting from both Thompson 's and McNaughton and Yamada's NFA 's. It also shows that the DFA produced from our NFA is as much as one order of magnitude smaller than DFA 's constructed from the two other NFA 's.

An UNIX egrep compatible software called cgrep based on our NFA representation is implemented. A benchmark shows that cgrep is dramatically faster than both UNIX egrep and GNU e?grep.

Throughout this thesis the importance of syntax is stressed in the design of our algorithms. In particular, we exploit a method of program improvement in which costly repeated calculations can be avoided by establishing and maintaining program invariants. This method of symbolic finite differencing has been used previously by Douglas Smith to derive efficient functional programs.

12/7/7 (Item 1 from file: 144)
DIALOG(R)File 144:Pascal
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13046509 PASCAL No.: 97-0336137
From regular expressions to DFA 's using compressed NFA 's
CHANG C H; PAIGE R
Institute of Information Science, Academica Sinica, Teipei, Taiwan; Courant Institute of Mathematical Sciences, New York University, 251 Mercer St., New York, NY 10012, United States
Journal: Theoretical computer science, 1997, 178 (1-2) 1-36
ISSN: 0304-3975 CODEN: TCSCDI Availability: INIST-17243; 354000061532340002
Document Type: P (Serial) ; A (Analytic)
Country of Publication: Netherlands
Language: English Summary Language: English
Copyright (c) 1997 Elsevier Science B.V. All rights reserved. There are two principal methods for turning regular expressions into NFA 's - one due to McNaughton and Yamada and another due to Thompson . Unfortunately, both have drawbacks. Given a regular expression R of length r and with s occurrences of alphabet symbols, Chang and Paige (1992) and Brueggemann-Klein (1993) gave &Tgr;(m+r) time and O(r) space algorithms to produce a &Tgr;(m) space representation of McNaughton and Yamada's NFA with s+1 states and m transitions. The problem with this NFA is that m=&Tgr;(s SUP 2) in the worst case. Thompson 's method takes &Tgr;(r) time and space to construct a &Tgr;(r) space NFA with &Tgr;(r) states and &Tgr;(r) transitions. The problem with this NFA is that r can be arbitrarily larger than s. We overcome drawbacks of both methods with a &Tgr;(r) time &Tgr;(s) space algorithm to construct an O(s) space representation of McNaughton and Yamada's NFA . Given any set V of NFA states, our representation can be used to compute the set U of states one transition away from the states in V in optimal time O(|V|+|U|). McNaughton and Yamada's NFA requires &Tgr;(|V|x|U|) time in the worst case. Using Thompson 's NFA , the equivalent calculation requires &Tgr;(r) time in the worst case. Comparative benchmarks show that an implementation of our method outperforms implementations of competing methods with respect to time for NFA construction, NFA accepting testing, and NFA -to- DFA conversion by subset construction. Throughout this paper program transformations are used to design algorithms and derive programs. A transformation of special importance is a form of finite differencing used previously by Douglas Smith to improve the efficiency of functional programs.

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File 347:JAPIO Dec 1976-2005/Dec(Updated 060404)
         (c) 2006 JPO & JAPIO
File 350:Derwent WPIX 1963-2006/UD=200660
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File 348:EUROPEAN PATENTS 1978-2006/ 200638
         (c) 2006 European Patent Office
File 349:PCT FULLTEXT 1979-2006/UB=20060921UT=20060914
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? ds

Set     Items   Description
S1         14   AU='WYSCHOGROD D':AU='WYSCHOGROD, DANIEL'
S2         11   AU='LEIBMAN L':AU='LEIBMAN LEONID'
S3         10   S1 AND S2
S4          9   THOMPSON?(1W)CONSTRUCT?
S5          1   S1:S2 AND S4
? t5/5

 5/5/1     (Item 1 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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01150725    **Image available**
SYSTEM AND METHOD FOR DETERMINING THE START OF A MATCH OF A REGULAR
    EXPRESSION
SYSTEME ET PROCEDE PERMETTANT DE DETECTER LE DEBUT D'UNE CORRESPONDANCE
    D'UNE EXPRESSION REGULIERE
Patent Applicant/Assignee:
  SAFENET INC, 4690 Millennium Drive, Belcamp, MA 21017, US, US (Residence)
    , US (Nationality), (For all designated states except: US)
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Legal Representative:
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    Suite 108, Melville, New York 11747, US,
Patent and Priority Information (Country, Number, Date):
  Patent:               WO 200472797 A2 20040826 (WO 0472797)
  Application:          WO 2004US3622 20040206 (PCT/WO US04003622)
  Priority Application: US 2003445620 20030207
Designated States:
(All protection types applied unless otherwise stated - for applications
2004+)
  AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DE DK DM
  DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC
  LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO
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  (AP) BW GH GM KE LS MW MZ SD SL SZ TZ UG ZM ZW
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Main International Patent Class (v7): G06F
Publication Language: English
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Fulltext Availability:
  Detailed Description
  Claims
Fulltext Word Count: 8076

English Abstract
  A system for determining the start of a match of a regular expression
  includes a special state table that contains start entries and terminal
```

entries, and a set of start state registers for holding offset information. The system further includes a DFA next state table that, given the current state and an input character, returns the next state. A settable indicator is included in the DFA next state table corresponding to each next state table entry which indicates whether to perform a lookup in the special state table. A compiler loads values into the special state table based on the regular expression. A method for determining the start of a match of a regular expression using the special state table, the set of start state registers and the DFA next state table, includes the step of determining from the regular expression each start-of match start state and each end-of-match terminal state. For each start state, a start state entry is loaded into the special state table. For each terminal state, a terminal state entry is loaded into each special state table. The next state table is used to return the next

state from the current state and an input character. When a start state is encountered, the current offset from the beginning of the input character string is loaded into the start state register. When a terminal state is encountered, the terminal state entry is retrieved from the special state table, and the value of the start state register corresponding to the rule number of the terminal entry in the special state table is further retrieved. The value of the start state register which is retrieved indicates the location in the character string where the start-of-match occurred for a particular rule.

French Abstract

L'invention concerne un systeme permettant de detecter le debut d'une correspondance d'une expression reguliere, comprenant une table d'etat special contenant des entrees de debut et des entrees de fin, et une serie de registres d'etat de debut servant a contenir des informations d'ecart. Le systeme comprend egalement une table d'etat suivant DFA (automate deterministe a etats finis) qui, selon l'etat reel et un caractere entre, retourne l'etat suivant. La table d'etat suivant DFA comprend un indicateur reglable correspondant a chaque entree de table d'etat suivant indiquant s'il faut effectuer une recherche dans la table d'etat special. Ce systeme comprend egalement un compilateur permettant de charger des valeurs dans la table d'etat special sur la base de l'expression reguliere. L'invention concerne egalement un procede permettant de detecter le debut d'une correspondance d'une expression reguliere a l'aide de la table d'etat special, de l'ensemble de registres d'etat de debut et de la table d'etat suivant DFA, consistant a detecter a partir de l'expression reguliere chaque etat de debut de correspondance et chaque etat final de correspondance de fin. Pour chaque etat de debut, une entree d'etat de debut est chargee dans la table d'etat special. Pour chaque etat final, une entree d'etat final est chargee dans chaque table d'etat special. La table d'etat suivant est utilisee pour retourner l'etat suivant a partir de l'etat reel et un caractere d'entree. Lorsqu'un etat de debut est rencontre, le decalage reel par rapport au debut de la chaine de caracteres d'entree est charge dans le registre d'etat de debut. Lorsqu'un etat final est rencontre, l'entree d'etat final est recuperee de la table d'etat special, et la valeur du registre d'etat de debut correspondant au numero de regle de l'entree finale dans la table d'etat special est egalement recuperee. La valeur du registre d'etat de debut qui est recuperee indique l'emplacement dans la chaine de caracteres ou le debut de correspondant s'est produit pour une regle particuliere.

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